Bench Marking ARPES as "Bulk" Electronic Structure Probe

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As a hybrid of spectroscopy and scattering experiments, angle-resolved photoemission spectroscopy reveals the direction, the speed, and the scattering mechanism of valence electrons. In the past two decades, enormously improved resolution and carefully matched experiments have elevated this technique to a critical probe that sets the intellectual agenda by testing new ideas, discovering surprises, and challenging orthodoxies.

Due to the short mean free path of photoelectrons, a critical question on ARPES remains whether we are probing surface or bulk property. In this talk, I will provide few examples to show that, when properly performed, ARPES can indeed provide critical electronic structure of the bulk material. We will show how ARPES data can be compared with quantum oscillation, specific heat, conductivity, and superfluid density.